

Application No.: 10/552,532
Amendment Dated: March 2, 2010
Reply to Office Action of: November 2, 2009

MAT-8748US

Amendments to the Drawings:

The attached sheet of drawings includes changes to Figure 3. This sheet replaces the original sheet.

Application No.: 10/552,532
Amendment Dated: March 2, 2010
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MAT-8748US

Remarks/Arguments:

Claims 1-8 are presently pending. Claim 1 has been amended. Reconsideration is respectfully requested in view of the above amendments and the following remarks.

Claim Rejections Under 35 U.S.C. § 112

Page 2 of the Office Action sets forth "Claims 1-8 are rejected under 35 U.S.C. 112, first paragraph" for reciting in claim 1 that "the annular lubricant groove has an inner rim and an outer rim on the upper end of the main shaft." Applicant herein amends claim 1 to remove this language. Accordingly, Applicant respectfully submits that this rejection is obviated.

Pages 2-3 of the Office Action sets forth "Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph" for reciting in claim 1 "the annular lubricant groove has an inner rim and an outer rim on the upper end of the main shaft" and for reciting in claim 1 "the opening." Applicant herein amends claim 1 to remove this language. Accordingly, Applicant respectfully submits that the rejection based on these phrases is obviated.

Further, page 2 of the Office Action sets forth "Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph" for reciting in claim 1 "an annular lubricant groove provided between an upper end of the main shaft and an upper end of the bearing." Applicant herein amends claim 1 to recite:

...an annular lubricant groove having an inner rim and an outer rim...

...a bearing for supporting the main shaft, the bearing defining in part the outer rim of the annular lubricant groove...

...wherein the shaft includes...a circumferential notch defining in part the inner rim of the annular lubricant groove....

This means that the annular lubricant groove has an inner rim defined in part by a circumferential notch in the shaft. The annular lubricant groove has an outer rim

Application No.: 10/552,532
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MAT-8748US

defined in part by the bearing. Applicant respectfully submits that claim 1 clearly points out the subject matter which Applicant regards as the invention. Accordingly, Applicant respectfully requests that this rejection be withdrawn.

Claim Rejections Under 35 U.S.C. § 103

Page 3 of the Office Action sets forth "Claims 1-8 are rejected under 35 U.S.C. 103(a) as being...unpatentable over Nobuo et al. (Japanese patent publication number S62-44108) in view of Goodnight (US patent number 6457561B1) further in view of Choi (US patent number 5971724) and Fujiwara et al. (US patent number 4472114)." Applicant respectfully submits that this rejection is overcome by the amendments to the claims for the reasons set forth below.

Applicant's invention, as recited by claim 1, includes features which are neither disclosed nor suggested by the art of record, namely:

...an annular lubricant groove having an inner rim and an outer rim...

...a bearing...defining in part the outer rim of the annular lubricant groove...

...wherein the shaft includes...a circumferential notch defining in part the inner rim of the annular lubricant groove....

As set forth above, this means that the annular lubricant groove has an inner rim defined in part by a circumferential notch in the shaft. The annular lubricant groove has an outer rim defined in part by the bearing. This feature is described in the application, for example, at page 4, lines 8-20; page 5, line 12 to page 6, line 2; page 7, lines 1-14; and FIGS. 1-3.

The Advisory Action mailed February 17, 2010 indicates that the above claim amendments raise the issue of new matter. Applicant respectfully disagrees.

Applicant submits that one of ordinary skill in the art would interpret the horizontal line at the top of main shaft 123 in FIGS. 1-3 as defining the edge of a circumferential notch in the top of main shaft 123. Applicant respectfully submits that

there is no other reasonable interpretation of the horizontal line in FIGS. 1-3 except as defining a notch in main shaft 123.

Further, Applicant respectfully submits that one of ordinary skill in the art would interpret the above-mentioned portions of the specification as disclosing that the inner rim 199 of annular lubricant groove 141 is defined in part by a circumferential notch. As described in the specification, "reverse leading groove 139 opens into inner rim of annular lubricant groove 141, and the lubricant is pushed to the outer rim of annular lubricant groove 141 by the centrifugal force." See the original application at page 5, line 26 to page 6, line 1. Applicant submits that one of ordinary skill in the art would understand that, for centrifugal force to act on lubricant in the annular lubricant groove, the lubricant in the annular lubricant groove must be subject to rotation. To be subject to rotation, part of the annular lubricant groove must extend onto/into the main shaft 123. Thus, one of ordinary skill in the art would understand that main shaft 123 includes a circumferential (or annular) notch 197 that forms part of annular lubricant groove 141.

For the above reasons, Applicant respectfully submits that, taken as a whole, the specification supports the newly added feature of "a circumferential notch defining in part the inner rim of the annular lubricant groove." Accordingly, Applicant respectfully submits that the above amendments to claim 1 do not raise issues of new matter.

The Office Action acknowledges that Nobuo in view of Goodnight and Choi fails to disclose "an annular lubricant groove...provided between an upper end of the main shaft and an upper end of the bearing...wherein the annular lubricant groove has an inner-and-outer-rim...."—Applicant—respectfully—submits—that—the-addition-of—Fujiwara fails to make up for the deficiencies of Nobuo, Goodnight, and Choi with respect to at least these features.

Fujiwara is directed to an electric compressor. Fujiwara discloses an electric compressor 10 having a rotating shaft 58 supported in a bearing 64. A guide groove 70 is formed on the outer surface of rotating shaft 58. Bearing 64 includes a gain portion 72 connected to the guide groove 70. See Fujiwara at column 4, lines 11-35, and FIG. 1.

The gain portion 72 is defined in part by the bearing 64. Thus, the gain portion 72 of Fujiwara solely corresponds to the outer rim of the annular lubricant groove of claim 1. Fujiwara fails to disclose, teach, or suggest shaft 58 including a circumferential notch. Thus, Fujiwara fails to disclose, teach, or suggest gain portion 72 including an inner rim defined in part by a circumferential notch in shaft 58. This is different from claim 1, which requires an annular lubricant groove having an inner rim defined in part by a circumferential notch in the shaft and an outer rim defined in part by the bearing.

Accordingly, Applicant respectfully submits that Fujiwara fails to disclose, teach, or suggest "an annular lubricant groove having an inner rim and an outer rim...a bearing...defining in part the outer rim of the annular lubricant groove...wherein the shaft includes...a circumferential notch defining in part the inner rim of the annular lubricant groove," as recited in claim 1.

It is because Applicant's claimed invention requires that the annular lubricant groove have an inner rim defined in part by a circumferential notch in the shaft and an outer rim defined in part by the bearing that the following advantages are achieved. "[R]everse leading groove 139 opens into an inner rim 199 of annular lubricant groove 141.... The lubricant is then pushed to the outer rim 198 of annular lubricant groove 141 by the centrifugal force, so that little amount of the lubricant flows [backward] into reverse leading groove 139." See the application at page 5, line 26 to page 6, line 2. Similarly, "[F]orward leading groove 137 opens into inner rim of annular lubricant groove 141, and the lubricant is pushed to the outer rim of annular lubricant groove 141 by the centrifugal force [generated by the rotation of main shaft 123], so that little amount of the lubricant flows [backward] into forward leading groove 137."

See the application at page 7, lines 11-14.

Accordingly, for the reasons set forth above, claim 1 is allowable over the art of record. Withdrawal of the rejection and allowance of claim 1 is respectfully requested.

Claims 2-8 include all of the features of claim 1, from which they depend. Thus, claims 2-8 are also allowable over the art of record for at least the reasons set forth above with respect to claim 1. Withdrawal of the rejection and allowance of claims 2-8 is respectfully requested.

Application No.: 10/552,532
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MAT-8748US

New Claim

Claim 9 includes all of the features of claim 1, from which it depends. Thus, claim 9 is also allowable over the art of record for at least the reasons set forth above with respect to claim 1.

Additionally, Applicant's invention, as recited by claim 9, includes features which are neither disclosed nor suggested by the art of record, namely:

... an angle of the reverse leading groove with respect to a plane perpendicular to an axis of the main shaft is larger than an angle of the forward leading groove with respect to the plane perpendicular to the axis of the main shaft ...

This feature is illustrated in the application, for example, at FIGS. 2 and 3. No new matter is added. Accordingly, claim 9 is allowable over the art of record for at least this additional reason.

Applicant respectfully asserts that the above-identified application is in condition for allowance, which action is respectfully requested.

Respectfully submitted,

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Enclosure: Replacement FIG. 3 (1 sheet)

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